# INDEX

## A


*Acetabularia,* 501
Acetylcholine modulated potassium channels in the vestibular hair cell of the toadfish, *Opsanus tau,* 533
Adaptation, 534
ADELMAN, W. J., JR., see E. F. Stanley, 467
Adenlyl imidodiphosphate (AMP-PNP) a non-hydrolyzable analogue of ATP produces a stable intermediate in the motility cycle of fast axonal transport, 503
Aequorin, 524
Aerobic spore-forming bacteria, 516
Age determination, 186
Aggregation, 540
Aggression, 139
AGOSTINI, MARK A., see Steven J. Zottoli, 535
*Aiptasia* photosynthesis, 590
*Aiptasia pulchella,* 159
AKINS, R. E., D. A. LUTZ, AND S. INOUÉ, Microtubule assembly and pronuclear movement analyzed by microbeam inactivation of Colcemid, 501
ALBERTE, RANDALL S., see Robert D. Smith, 514
*Alcyonium siderium,* 613
ALEU, AGUSTIN LOBO, A preliminary study of the effect of mechanical disturbance on marine sediments, 505
Algal chemical composition, 251
Algal food, 251
ALKON, DANIEL L., SHIGETAKA NAITO, JOSEPH T. NEARY, JUNE HARRIGAN, MANABU SAKAKIBARA, ANDREW WEINER, AND ELIAHU HELDMAN, Inactivation of voltage-dependent $K^+$ currents is related to $Ca^{2+}$-calmodulin-dependent phosphorylation of specific protein, 521
ALKON, DANIEL L., see John F. Disterhoft, 526; and Michael Johnson, 536
ALLEN, NINA STROMGREN, see Elizabeth A. Bowles, 501
ALLEN, PHILIP G., Low pH sodium-free sea water reversibly blocks cleavage in embryos of *Arbacia punctulata,* 516
Allograft, 139
Alpha-2-macroglobulin, 538
Alpha-2-macroglobulin-like proteinase-binding activity in the blood of crustaceans, An, 540
Amino acids, 322, 514
Aminoglycoside antibiotics, 531
Amoebiasis of larval sea hares (*Aplysia californica*), 537
Amphipod crustaceans, 264, 647
Amylase induction in *Gammarus,* 647
An unusual form of alpha-2-macroglobulin isolated from the plasma of *Limulus polyphemus,* 538
*Anadara ovalis* hemoglobins: distinct dissociation and ligand binding characteristics, 538
*Anadara ovalis,* hemoglobins, 538
Anaerobic polyphosphate breakdown, 512
Analysis and comparison of stomach contents of the hermit crab *Pagurus longicarpus* in salt marsh sandy creek bottoms, mud flats, and rocky intertidal zones, 510
ANDERSON, DONALD M., see Geo T. Reynolds, 540
ANDERSON, KAREN L., AND JEANNE S. POINDEXTER, Coincidence and association of caulobacters and diatoms, 506
ANDERSON, P. A. V., see G. O. Mackie, 120
Anoxia, 514
*Anthopleura elegantissima,* 683
Anti-idiotype, 536
Antigens, 535
Aortic perfusion, 467
*Aplysia,* 460, 535, 537
Apparent absence of gap junctions in two classes of cnidaria, 120
*Arbacia,* 517
ARMSTRONG, PETER B., AND JAMES P. QUIGLEY, An unusual form of alpha-2-macroglobulin isolated from the plasma of *Limulus polyphemus,* 538
ARMSTRONG, PETER B., see Michael T. Rossner, 540
*Ascidia mentula,* 630
Ascidian capsule structure, 238
Ascidian cellular defense systems, 229, 238
Ascidian inflammatory-like reactions, 229, 238
Ascorbyl free radicals, 539
Assay, flat capillary, 322
Association between *Scoloplos fragilis* (Polychaeta, Orbiniidae) and purple sulfur bacteria in Great Sippewissett Salt Marsh (Woods Hole, Massachusetts), 508
Asymmetric claw closer muscle, 713
ATEMA, JELLE, see Diana E. Barshaw, 506; Diane Cowan, 525; Donna McPhie, 510; and Rainer Voigt, 534
Axon, 529
Axonal transport, 503, 524


## B


*Bacillus,* 515
Bacteria, clumping, 514
Bacterial capsule formation, 514
Bacterial endosymbionts of *Lucina,* 445
Bacteriophage PR4, 507
BAKER, H., AND M. WEISER, Catecholamine neurons in normal and deafferented toadfish (*Opsanus tau*) olfactory bulb and telencephalon, 522
BAKER, R., see W. Graf, 527
BALOUN, ANDREA J., AND DANIEL E. MORSE, Ionic control of settlement and metamorphosis in larval *Haliotis rufescens* (Gastropoda), 124
BARLOW, ROBERT B., JR., MAUREEN K. POWERS, LEONARD KASS, ROBERT W. FIORDALICE,

# INDEX

## A


*Acetabularia,* 501
Acetylcholine modulated potassium channels in the vestibular hair cell of the toadfish, *Opsanus tau,* 533
Adaptation, 534
ADELMAN, W. J., JR., see E. F. Stanley, 467
Adenlyl imidodiphosphate (AMP-PNP) a non-hydrolyzable analogue of ATP produces a stable intermediate in the motility cycle of fast axonal transport, 503
Aequorin, 524
Aerobic spore-forming bacteria, 516
Age determination, 186
Aggregation, 540
Aggression, 139
AGOSTINI, MARK A., see Steven J. Zottoli, 535
*Aiptasia* photosynthesis, 590
*Aiptasia pulchella,* 159
AKINS, R. E., D. A. LUTZ, AND S. INOUÉ, Microtubule assembly and pronuclear movement analyzed by microbeam inactivation of Colcemid, 501
ALBERTE, RANDALL S., see Robert D. Smith, 514
*Alcyonium siderium,* 613
ALEU, AGUSTIN LOBO, A preliminary study of the effect of mechanical disturbance on marine sediments, 505
Algal chemical composition, 251
Algal food, 251
ALKON, DANIEL L., SHIGETAKA NAITO, JOSEPH T. NEARY, JUNE HARRIGAN, MANABU SAKAKIBARA, ANDREW WEINER, AND ELIAHU HELDMAN, Inactivation of voltage-dependent $K^+$ currents is related to $Ca^{2+}$-calmodulin-dependent phosphorylation of specific protein, 521
ALKON, DANIEL L., see John F. Disterhoft, 526; and Michael Johnson, 536
ALLEN, NINA STROMGREN, see Elizabeth A. Bowles, 501
ALLEN, PHILIP G., Low pH sodium-free sea water reversibly blocks cleavage in embryos of *Arbacia punctulata,* 516
Allograft, 139
Alpha-2-macroglobulin, 538
Alpha-2-macroglobulin-like proteinase-binding activity in the blood of crustaceans, An, 540
Amino acids, 322, 514
Aminoglycoside antibiotics, 531
Amoebiasis of larval sea hares (*Aplysia californica*), 537
Amphipod crustaceans, 264, 647
Amylase induction in *Gammarus,* 647
An unusual form of alpha-2-macroglobulin isolated from the plasma of *Limulus polyphemus,* 538
*Anadara ovalis* hemoglobins: distinct dissociation and ligand binding characteristics, 538
*Anadara ovalis,* hemoglobins, 538
Anaerobic polyphosphate breakdown, 512
Analysis and comparison of stomach contents of the hermit crab *Pagurus longicarpus* in salt marsh sandy creek bottoms, mud flats, and rocky intertidal zones, 510
ANDERSON, DONALD M., see Geo T. Reynolds, 540
ANDERSON, KAREN L., AND JEANNE S. POINDEXTER, Coincidence and association of caulobacters and diatoms, 506
ANDERSON, P. A. V., see G. O. Mackie, 120
Anoxia, 514
*Anthopleura elegantissima,* 683
Anti-idiotype, 536
Antigens, 535
Aortic perfusion, 467
*Aplysia,* 460, 535, 537
Apparent absence of gap junctions in two classes of cnidaria, 120
*Arbacia,* 517
ARMSTRONG, PETER B., AND JAMES P. QUIGLEY, An unusual form of alpha-2-macroglobulin isolated from the plasma of *Limulus polyphemus,* 538
ARMSTRONG, PETER B., see Michael T. Rossner, 540
*Ascidia mentula,* 630
Ascidian capsule structure, 238
Ascidian cellular defense systems, 229, 238
Ascidian inflammatory-like reactions, 229, 238
Ascorbyl free radicals, 539
Assay, flat capillary, 322
Association between *Scoloplos fragilis* (Polychaeta, Orbiniidae) and purple sulfur bacteria in Great Sippewissett Salt Marsh (Woods Hole, Massachusetts), 508
Asymmetric claw closer muscle, 713
ATEMA, JELLE, see Diana E. Barshaw, 506; Diane Cowan, 525; Donna McPhie, 510; and Rainer Voigt, 534
Axon, 529
Axonal transport, 503, 524


## B


*Bacillus,* 515
Bacteria, clumping, 514
Bacterial capsule formation, 514
Bacterial endosymbionts of *Lucina,* 445
Bacteriophage PR4, 507
BAKER, H., AND M. WEISER, Catecholamine neurons in normal and deafferented toadfish (*Opsanus tau*) olfactory bulb and telencephalon, 522
BAKER, R., see W. Graf, 527
BALOUN, ANDREA J., AND DANIEL E. MORSE, Ionic control of settlement and metamorphosis in larval *Haliotis rufescens* (Gastropoda), 124
BARLOW, ROBERT B., JR., MAUREEN K. POWERS, LEONARD KASS, ROBERT W. FIORDALICE,

MARK D. CAMARA, AND HEIDI A. HOWARD, Vision in *Limulus* mating behavior during the day and at night, 522
BARLOW, ROBERT B., JR., see George H. Renninger, 532; and Heidi A. Howard, 527
Barnacles, 525, 529
BARSHAW, DIANA E., AND JELLE ATEMA, Effects of drilling mud on the behavior, growth, and survival of young juvenile lobsters, 506
BAYER, CYNTHIA, see Leslie B. Vosshall, 540
BEARCE, CATHERINE, see Frederic Blum, 517
BECKER, FREDERICK, see Peter Gascoyne, 539
BECKER, J. DAVID, see David J. Goldhamer, 518
Behavior, 525, 601
BEIJNINK, F. B., AND P. A. VOOGT, Nutrient translocation in the sea star: whole-body and microautoradiography after ingestion of radiolabeled leucine and palmitic acid, 669
Benthic communities, 264
Benthos, 505
BEST, BARBARA A., AND JUDITH E. WINSTON, Skeletal strength of encrusting cheilostome bryozoans, 390
BIDWELL, JOSEPH, see Louis Leibovitz, 537
Biology of hydractiniid hydroids. 2. Histocompatibility effector system/competitive mechanism mediated by nematocyst discharge, 139
Bioluminescene, 410, 540
Biomechanics, 200, 613
*Bittium alternatum,* 508
Bivalve molluscs, 698
BLACK, J. N. P., Substratum hydrophobicity and larval settlement in *Janua* (*Dexiospira*) *brasiliensis* Grube (Polychaeta: Spirorbidae), 506
BLUE, SKY, AND JOHN E. CRONAN, JR., A new topoisomerase in *Escherichia coli???,* 507
BLUM, FREDERIC, CATHERINE BEARCE, KRISTINA FRENKEL, AND WALTER TROLL, Hydrogen peroxide: source of hypochlorite blocking fertilization in *Arbacia punctulata,* 517
BOEHLERT, GEORGE W., AND MARY M. YOKLAVICH, Reproduction, embryonic energetics, and the maternal-fetal relationship in the viviparous genus *Sebastes* (Pisces: Scorpaenidae), 354
BORGESE, THOMAS A., JOHN P. HARRINGTON, AND RONALD L. NAGEL, *Anadara ovalis* hemoglobins: distinct dissociation and ligand binding characteristics, 538
BOROWSKY, RICHARD, Environment control of amylase phenotype in amphipods of the genus *Gammarus,* 647
BOWLES, ELIZABETH A., AND NINA STROMGREN ALLEN, Steady currents go through *Acetabularia crenulata:* a vibrating probe analysis, 501
BOYER, BARBARA C., Further studies on early determination in the polyclad embryo, 517
BOYER, BARBARA C., see Louisa M. Rooney, 519
BOYLE, R., AND S. M. HIGHSTEIN, Effects of behavioral activation of the efferent vestibular system on the response dynamics of primary afferents of the horizontal semicircular canal in the toadfish, *Opsanus tau,* 523
BRADY, SCOTT T., see Raymond J. Lasek, 503; and Trina A. Schroer, 504
Brain, microtubules of, 502, 505
Brain-spectrin (fodrin) distribution in the squid giant axon, 502
BREHM, PAUL, AND KATHLEEN DUNLAP, Control of light emission from *Obelia* photocytes, 523
BRENNER, RODOLFO R., see Graciela A. Huca, 698
BRYANT, DONALD R., Changes in sediment stability caused by addition of sediment-bound #2 fuel oil, 507
Bryozoa, 390
*Bugula,* 513
BUSS, LEO W., CATHERINE S. MCFADDEN, AND DOUGLAS R. KEENE, Biology of hydractiniid hydroids. 2. Histocompatibility effector system/competitive mechanism mediated by nematocyst discharge, 139

## C

$Ca^{++}$/calmodulin-dependent protein kinase II, 530
Cadmium, 467
Calcium, 529
Calcium and transmitter release, 532
Calcium oscillations in the neuropile of crab stomatogastric neurons detected with Arsenazo III, 532
Calcium-activated photoprotein, 523
Calcium-free medium, 467
CAMARA, MARK D., see Heidi A. Howard, 527; and Robert B. Barlow, Jr., 522
CANICATTI, CALOGERO, see Nicolo Parrinello, 229
CAPO, THOMAS R., see Michael J. Good, 535; and Michael Johnson, 536
CAPRIO, JOHN, see David W. Garton, 310
Carbon budget, 477
Carbon fixation, 445
CARBONE, P., see R. Vitturi, 658
*Carcinonemertes,* 331, 426
CARIELLO, LUCIO, AND LEONARD NELSON, Enkephalin, opiate of the sperm cell: the Neapolitan connection, 524
CARROLL, WILLIAM T., see David J. Goldhamer, 518
CASE, JAMES F., see Richard K. Zimmer-Faust, 339
CATALANO, E., see R. Vitturi, 658
Catecholamine neurons in normal and deafferented toadfish (*Opsanus tau*) olfactory bulb and telencephalon, 522
Caulobacter, 506
Cell cycle, 516
Cell surface charge, 539
Cell volume regulation, 495
Cerebellar field potentials evoked by optic nerve stimulation in the little skate, *Raja erinacea,* 530
Cerebellum, 530
*Chaetopterus variopedatus* (Renier) (Annelida: Polychaeta: Chaetopteridae): a species complex. What species are being used at MBL? 513

CHANG, D. C., Transport of $Na^+$ inside the giant axon of squid, 524
Changes in sediment stability caused by addition of sediment-bound #2 fuel oil, 507
Characterization of the sea robin Mauthner cell, 535
Chemical communication in lobsters: information currents, 510
Chemical cues, 525
Chemical mediation of appetitive feeding in a marine decapod crustacean: the importance of suppression and synergism, 339
Chemoautotrophic metabolism, 445
Chemoautotrophic symbionts in the bivalve *Lucina floridana* from seagrass beds, 445
Chemoreception, 339, 534
Chemoreceptor adaptation: responses of glutamate cells to repeated stimulation, 534
Chemoreceptors, 310
Chemosensitivity to nicotine in the crayfish slowly adapting stretch receptor, 534
Chemosensory responses to amino acids and certain amines by the ciliate *Tetrahymena:* a flat capillary assay, 322
Chemostat, 507
Chemotaxis, 514
CHIA, FU-SHIANG, see J. Timothy Pennington, 168
Chromosome polymorphism in *Gobius paganellus,* Linneo 1785 (Pisces, Gobiidae), 658
Chthamalus, 176
CHUNG, C., see M. Levandowsky, 322
Cilia, 504
*Ciona intestinalis* hemagglutinins, 229
Circadian clock increases the gain of photoreceptor cells of the *Limulus* lateral eye, A, 532
Circadian rhythms, 532
Claw, 713
CLAYTON, WILLIAM S., JR., AND HOWARD R. LASKER, Host feeding regime and zooxanthellal photosynthesis in the anemone, *Aiptasia pallida* (Verrill), 590
Clumping behavior of bacteria isolated from waste water treatment sludge, 514
Cnidaria, 120, 139
Cnidarian symbioses, 159
*Codium fragile,* 513
COHEN, L. B., see J. A. London, 529
Coincidence and association of caulobacters and diatoms, 506
Colcemid, 501
COLLEY, D., see D. Harn, 536
COLLIER, J. R., Protein synthesis in normal and lobeless gastrulae of *Ilyanassa obsoleta,* 371
COLLINS, B. A., AND E. F. MACNICHOL, JR., Morphological observations and microspectrophotometric data from photoreceptors in the retina of the sea raven, *Hemitripterus americanus,* 437
CHENG, T., see M. Levandowsky, 322
Communication, chemical, 510
Comparative reproductive adaptations of grass shrimps, *Palaemonetes vulgaris* and *P. pugio* in Great Sippewissett Salt Marsh, 516
COMPEAU, GEOFFREY C., AND JEANNE S. POINDEXTER, Isolation of fast-growing, lactate-utilizing, oligotrophic bacteria, 507
Competition, 176
Conditioning causes intrinsic membrane changes of rabbit hippocampal neurons *in vitro,* 526
Control of light emission from *Obelia* photocytes, 523
Copper metabolism in crab larvae, 704
Copper toxicity, 704
Copulation by hypodermic injection in the nudibranchs *Palio zosterae* and *P. dubia* (Gastropoda, Opisthobranchia), 543
Coral reef anemone, 601
Correlates of electrical and mechanical activity during ciliary reversal in the ctenophore *Pleurobrachia pileus,* 504
CORSON, D. WESLEY, ALAN FEIN, AND RICHARD PAYNE, Detection of an inositol 1,4,5-triphosphate-induced rise in intracellular free calcium with aequorin in *Limulus* ventral photoreceptors, 524
CORSON, D. WESLEY, see Alan Fein, 526; and Richard Payne, 531
COULTER, DOUGLAS A., see John F. Disterhoft, 526
COWAN, DIANE, AND JELLE ATEMA, Sex discrimination in lobsters: urine cues, 525
Crab larvae, 704
Crayfish, 534
Critical velocity, 507
Critical weights for metamorphosis in the tobacco hornworm, *Manduca sexta,* 555
CRONAN, JOHN E., JR., see Sky Blue, 507
Cross-bridges between axonally transported vesicles and mirotubules in cold-blocked squid axoplasm, 503
Crustacea, 540, 713
Ctenophora, 210, 504
Current measurements, 501
Currents, ionic, 502
CURRIE, SCOTT, Mauthner cells, Muller cells, and the lamprey startle response, 525
Cyclic adenosine 3',5'-pyrophosphate, 519
Cytokenesis, 516
*Cytophaga,* 514
Cytoplasmic determinants, 521
Cytoplasmic pH, 516
Cytoskeleton, 502
Cytosolic ligands, 704

## D

DFPase, 539
DNA cloning, 535
DNA gyrase, 507
Daily budgets of photosynthetically fixed carbon in symbiotic zoanthids, 477
DAVID, PETER H., KAMINI N. MENDIS, RABIA HUSSAIN, THOMAS F. MCCUTCHAN, AND DYANN F. WIRTH, Expression of malaria antigens in *Escherichia coli:* cloning of *Plasmodium vivax* DNA cut with mung bean nuclease, 535
DAVIS, RALPH E., JOHN W. MOORE, AND ANN E.

STUART, Voltage clamp studies of the terminal region of barnacle photoreceptors, 525
Dechorionation, 518
Decline in calcium cooperativity as a mechanism of facilitation at the squid giant synapse, 532
Deep sea spore formers, 516
Defenses of a polychaete larva, 168
Degranulation, 229, 238
Density, 535
DESSNER, DAN, see Jay Shiro Tashiro, 515
Detection of inositol 1,4,5-trisphosphate-induced rise in intracellular free calcium with aequorin in *Limulus* ventral photoreceptors, 524
Determinants of larval molt initiation in the tobacco hornworm, *Manduca sexta,* 568
Determination, 371
Development of asymmetry in the neuromuscular system of lobster claws, 94
Development of *in vitro* fertilized eggs of the squid *Loligo pealei,* and techniques for dechorionationation and artificial activation, 518
Development, 354, 517, 519
Diatom, 506
Diet, 509
Digestion and distribution of tripalmitoylglycerol in *Diplodon delodontus* (Mollusca, Bivalvia), 698
Digestion of tubulin genes from *Leishmania enrietti* with mung bean nuclease, 537
Dimorphic claws of the hermit crab, *Pagurus pollicaris:* properties of the closer muscle, The, 713
Direct access of ions to the squid stellate ganglion giant synapse by aortic perfusion: effects of calcium-free medium, lanthanum, and cadmium, 467
Dispersal of zooxanthellae on coral reefs by predators on cnidarians, 159
DISTERHOFT, JOHN F., DOUGLAS A. COULTER, AND DANIEL L. ALKON, Conditioning causes intrinsic membrane changes of rabbit hippocampal neurons *in vitro,* 526
Disturbance, 264, 505
Diurnal changes in free amino acid patterns of *Zostera marina* L. roots, 514
Does maternal RNA have morphogenetic determinant activity in ascidian embryos? 521
Dogfish shark, 505
Drilling mud, 506
DUNHAM, PHILIP, see Leslie B. Vosshall, 540
DUNLAP, KATHLEEN, see Paul Brehm, 523
DUNLAP, PAUL V., Physiological and morphological state of the symbiotic bacteria from light organs of ponyfish, 410
Dyar's Law, 568
DYKENS, JAMES A., AND J. MALCOLM SHICK, Photobiology of the symbiotic sea anemone, *Anthopleura elegantissima:* defenses against photodynamic effects, and seasonal photoacclimatization, 683

## E

Ecdysone, 555, 568
EDWARDS, SAMUEL C., see Sidney K. Pierce, 495
Effect of colony density on larval recruitment in two species of *Bugula* (Ectoprocta) in Eel Pond, Woods Hole, Massachusetts, 513
Effect of different diets on the growth of juvenile striped mullet, *Mugil cephalus,* Linnaeus, The, 509
Effects of behavioral activation of the efferent vestibular system on the response dynamics of primary afferents of the horizontal semicircular canal in the toadfish, *Opsanus tau,* 523
Effects of drilling mud on the behavior, growth, and survival of young juvenile lobsters, 506
Efferent vestibular system, 523
Egg capsule, 378
Egg, 271
Ehrlich ascites cells, 539
Electron spin resonance, 539
Electrophoresis, 371
Electrophoresis, self, 502
Electrophoretic model of axonal organelle transport, An, 502
Electrophysiology, 504
*Elysia* osmolyte: proline betaine, 495
Embryo culture, 518
Embryos, 354
*Emerita analoga,* 579
Encapsulation, 229, 238
Endospores, 509
Energetics, 354
Enkephalin, opiate of the sperm cell: the Neapolitan connection, 524
Environmental control of amylase phenotype in amphipods of the genus *Gammarus,* 647
Environmental cues, 527
Enzyme induction, 647
Epibiontic bacteria, 506
Epiphytes, 508
Epithelial conduction, 120
Epithelial transport, 528
*Eudistylia vancouveri,* 200
Evaluation of a new tetrodotoxin preparation, 528
Evolution, 354
Excitable epithelia, 523
Expression of malaria antigens in *Escherichia coli:* cloning of *Plasmodium vivax* DNA cut with mung bean nuclease, 535
Exquisite squid lens: an alternative system of transparency and accommodation, The, 541

## F

FMRFamid-like neuropeptide of *Aplysia* is FMRFamide, The, 460
Facilitation of transmitter release, 532
Factors affecting the synthesis and release of polyphosphate in *Pseudomonas vesicularis,* 512
Fast axonal transport (FAT) of fluorescently labelled elasmobranch synaptic vesicles in isolated axoplasm from squid giant axon, 504
Fast axonal transport, 502, 504
Fat digestion in *D. delodontus,* 698
FATH, KARL R., AND RAYMOND J. LASEK, Brain-

spectrin (fodrin) distribution in the squid giant axon, 502
Feeding, 339, 515
Feeding by *Carcinonemertes* spp., 426
Feeding currents comparison, 200
Feeding ecology, 264
FEIN, ALAN, D. WESLEY CORSON, AND RICHARD PAYNE, Information flow in phototransduction from rhodopsin to a GTP-binding regulatory protein to phospholipase-C, 526
FEIN, ALAN, see D. Wesley Corson, 524; and Richard Payne, 531
FERRY, JAMES G., see B. R. Johnson, 509
Fertilization, 271, 517
Fiddler crabs, 510
Fine structure and vital staining of osphradium of the southern oyster drill, *Thais haemastoma canaliculata* (Gray) (Prosobranchia: Muricidae), 310
FIORDALICE, ROBERT W., see Heidi A. Howard, 527; and Robert B. Barlow, Jr., 522
Fish feces, 159
FISHER, MARK R., AND STEVEN C. HAND, Chemoautotrophic symbionts in the bivalve *Lucina floridana* from seagrass beds, 445
FLEMING, CHRIS, see Jay Shiro Tashiro, 515
Flounder, 527
Flow and feeding, 613
Fluorescent probes, 540
Food-induced size-specific molt synchrony of the sand crab, *Emerita analoga* (Stimpson), 579
Formation, organization, and composition of the egg capsule of the marine gastropod, *Ilyanassa obsoleta*, 378
Fouling communities, 513
FRANKLIN, LINDA A., Influence of *Bittium alternatum* grazing on epiphytes of *Zostera marina* (L.): changes in epiphyte pigment content and composition, 508
Free radical scavenging, 539
FRENKEL, KRISTINA, see Frederic Blum, 517
Fuel oil, #2, 507
Further studies of early determination in the polyclad embryo, 517

## G

GTP-binding protein, 526
Gain increases, 532
GAMBI, MARIA CRISTINA, Association between *Scoloplos fragilis* (Polychaeta, Orbiniidae) and purple sulfur bacteria in Great Sippewissett Salt Marsh (Woods Hole, Massachusetts), 508
Gametogenesis, 669
*Gammarus*, 647
Gap junction
Gap junctions in Cnidaria, 120
GARDNER, L., see M. Levandowsky, 322
GARTON, DAVID W., RICHARD A. ROLLER, AND JOHN CAPRIO, Fine structure and vital staining of osphradium of the southern oyster drill, *Thais haemastoma canaliculata* (Gray) (Prosobranchia: Muricidae), 310
GASCOYNE, PETER, FREDERICK BECKER, CHIU-NAN LAI, JANE MCLAUGHLIN, RONALD PETHIG, AND ALBERT SZENT-GYÖRGYI, The scavenging of ascorbic acid and semiquinone free radicals by normal and transformed cells, 539
GASCOYNE, PETER, see Ronald Pethig, 539
Gastropod, 124, 310
Gastropod development, 378
Gastrulation, 371
Giant smooth muscle fibers of the ctenophore *Mnemiopsis leydii:* ultrastructural study of *in situ* and isolated cells, 210
Giant synapse, 467
Gliding motility, 514
Glutamate, 534
*Gobius paganellus*, 658
GOLDHAMER, DAVID J., WILLIAM T. CARROLL, K. DAVID BECKER, AND ANDREW P. MCMAHON, Synthesis of heat shock proteins during development of the starfish, *Asterias forbesi*, 518
GOOD, MICHAEL J., THOMAS R. CAPO, AND LLOYD NADEAU, Variation in growth of post-metamorphic *Aplysia californica*, 535
Gossypol, 520
GOVIND, C. K., Development of asymmetry in the neuromuscular system of lobster claws, 94
GRAF, W., AND R. BAKER, Synaptic potentials in antidromically identified oculomotoneurons in the winter flounder, *Pseudopleuronectes americanus*, 527
GRAF, WERNER, see James McGurk, 530
Grass shrimp, 516
GRAUBARD, KATHERINE, see William N. Ross, 532
Gray whale feeding grounds, 264
Grazing, 513
GREENBERG, M. J., see H. K. Lehman, 460
GREENGARD, P., see T. L. McGuinness, 530
GRIFFITH, CHRISTOPHER J., see Keshav K. Singh, 514
Growth and germination of deep sea bacteria, 516
Growth and mortality, 509
Growth rate, 186
Growth rates of the sea scallop, *Placopecten magellanicus*, determined from the $^{18}O/^{16}O$ record in shell calcite, 186
Growth, 535, 704

## H

$H_2$ transfer, 509
*Haliotis rufescens*, 124
HALVORSON, HARLYN, O., see Jerry Nick, 512; Peter B. Vander Horn, 516; and Theresa A. Tiernan, 515
HAND, STEVEN C., see Mark R. Fisher, 445
HARN, D., L. LEUM, G. JEFFERS, AND D. COLLEY, A protective monoclonal antibody to *S. mansoni* induces both anti-idiotypic and idiotypic monoclonal antibodies as well as anti-idiotypic T cells, 536

HARRIGAN, JUNE, see Daniel L. Alkon, 521
HARRINGTON, JOHN P., see Thomas A. Borgese, 538
Hatching, 378
Heat shock protein synthesis, 518
HELDMAN, ELIAHU, see Daniel L. Alkon, 521
Hemoglobin dissociation, 538
Hermit crab, 510, 533
HERNANDEZ-NICAISE, MARI-LUZ, GHISLAIN NICAISE, AND LUC MALAVAL, Giant smooth muscle fibers of the ctenophore *Mnemiopsis leydii:* ultrastructural study of *in situ* and isolated cells, 210
HIGHSTEIN, S. M., see R. Boyle, 523
HIRAI, S., T. KISHIMOTO, S. S. KOIDE, AND H. KANATANI, Serotonin induction of spawning and oocyte maturation in *Spisula,* 518
*Homarus americanus,* see Lobster
HOSKIN, FRANCIS C. G., Inhibition of a Soman- and DFP-detoxifying enzyme (DFPase) by the organophosphorus insecticide, Mipafox, 539
Host feeding regime and zooxanthellal photosynthesis in the anemone, *Aiptasia pallida* (Verrill), 590
HOWARD, HEIDI A., ROBERT W. FIORDALICE, MARK D. CAMARA, LEONARD KASS, MAUREEN K. POWERS, AND ROBERT B. BARLOW, JR., Mating behavior of *Limulus:* relation to lunar phase, tide height, and sunlight, 527
HOWARD, HEIDI, see Robert B. Barlow, Jr., 522
HU, S. L., AND C. Y. KAO, Evaluation of a new tetrodotoxin preparation, 528
HUCA, GRACIELA A., RICARDO J. POLLERO, AND RODOLFO R. BRENNER, Digestion and distribution of tripalmitoylglycerol in *Diplodon delodontus* (Mollusa, Bivalvia), 698
HUSSAIN, RABIA, see Peter H. David, 535
Hybridomas, 536
Hydrogen peroxide: source of hypochlorite blocking fertilization in *Arbacia punctulata,* 517
Hydrogen sulfide, 445
Hydroid competition and histocompatibility, 139
Hypochlorite, 517

## I

*Ilyanassa obsoleta,* 378, 488
Image intensification, 540
Inactivation of voltage-dependent $K^+$ currents is related to $Ca^{2+}$-calmodulin-dependent phosphorylation of specific protein, 521
Inflammatory-like reaction in the tunic of *Ciona intestinalis* (Tunicata). I. Encapsulation and tissue injury, 299
Inflammatory-like reaction in the tunic of *Ciona intestinalis* (Tunicata). II. Capsule components, 238
Inflammed tissue injury, 229
Influence of *Bittium alternatum* grazing on epiphytes of *Zostera marina* (L.): changes in epiphyte pigment content and composition, 508
Influence of chemical composition of algal food sources on growth of juvenile oysters, *Crassostrea virginica,* 251
Information flow in phototransduction from rhodopsin to a GTP-binding regulatory protein to phospholipase-C, 526
Inhibition of a Soman- and DFP-detoxifying enzyme (DFPase) by the organophosphorus insecticide, Mipafox, 539
Inositol 1,4,5-trisphosphate (InsP3), 524
Inositol trisphosphate, 531
INOUÉ, S., see R. E. Akins, 501
Interference competition, 139
Interference of group-dependent motility with detection of chemotaxis in cytophagas, 514
Interhost transfer by *Carcinonemertes,* 331,
Interneuron, 533
Interstitial cell, 139
Intracellular calcium, 531
Ion access to the giant synapse, 467
Ionic control of settlement and metamorphosis in larval *Haliotis rufescens* (Gastropoda), 124
Ionic transduction, 124
Isograft, 139
Isolated axoplasm, 504
Isolation and characterization of *Spisula* sperm components by $^{14}C$-gossypol, 520
Isolation of fast-growing, lactate-utilizing, oligotrophic bacteria, 507
Isozymes, 647

## J

JAFFE, LAURINDA A., see Karen C. Klein, 518
JAFFE, LIONEL F., An electrophoretic model of axonal organelle transport, 502
JANNASCH, HOLGER, see Peter B. Vander Horn, 516
*Janua brasiliensis,* 506
JARAMILLO, EDUARDO, see Karin Lunecke, 510
JEFFERS, G., see D. Harn, 536
JENKINS, KENNETH D., see Brenda M. Sanders, 704
JOHNSON, B. R., AND JAMES G. FERRY, Methanogenic bacteria isolated from the purple sand of the Sippewissett Marsh, 509
JOHNSON, MICHAEL, THOMAS CAPO, ALAN M. KUZIRIAN, LOUIS LEIBOVITZ, HEATHER URQUHART, AND DANIEL L. ALKON, Larval health of *Hermissenda* in mass culture, 536
JONES, DOUGLAS S., see David E. Krantz, 186
Juvenile
  hormone, 555
  lobsters, 506
  striped mullet, 509

## K

$K^+$ currents, 521
KANATANI, H., see S. Hirai, 518
KAO, C. Y., see S. L. Hu, 528
KAPLAN, EHUD, see George H. Renninger, 532
Karyotype, 658
KASS, LEONARD, see Heidi A. Howard, 527; and Robert B. Barlow, Jr., 522
KATZ, URI, AND CARL SCHEFFEY, Voltage-depen-

dent chloride conductance of toad skin: localization by vibrating probe, 528
KEENE, DOUGLAS R., see Leo W. Buss, 139
KEHR, A., see M. Levandowsky, 322
KEYNAN, ALEX, see Jerry Nick, 512; Peter B. Vander Horn, 516; and Theresa A. Tiernan, 515
KIM, J., see M. Levandowsky, 322
KISHIMOTO, T., see S. Hirai, 518
KLAINER, PETER, see Philip J. Stephens, 713
KLEIN, KAREN C., AND LAURINDA A. JAFFE, Development of *in vitro* fertilized eggs of the squid *Loligo peali*, and techniques for dechorionation and artificial activation, 518
KLINGLER, LORI J., see Sidney K. Pierce, 495
KOIDE, S. S., E. SATO, M. K. SAHNI, H. N. WOOD, AND D. G. LYNN, A novel nucleotide from *Spisula* regulating meiotic arrest of oocytes, 519
KOIDE, S. S., see E. Sato, 520; Hiroshi Ueno, 520; and S. Hirai, 518
KRANTZ, DAVID E., DOUGLAS S. JONES, AND DOUGLAS F. WILLIAMS, Growth rates of the sea scallop, *Placopecten magellanicus*, determined from the $^{18}O/^{16}O$ record in shell calcite, 186
KURIS, ARMAND M., see Daniel E. Wickham, 331
KUZIRIAN, ALAN M., see Michael Johnson, 536
KVITEK, RIKK G., see John S. Oliver, 264

## L

Laboratory studies of feeding and mating in species of *Carcinonemertes* (Nemertea: Hoplonemertea), 426
LAI, CHIU-NAN, see Peter Gascoyne, 539
LAI, G., see M. Levandowsky, 322
Lamprey, 525
LANDFEAR, SCOTT, see Kim Lee Sim, 537
LANDOWNE, DAVID, Optical measurements of activation and inactivation of sodium channels, 528
LANGFORD, GEORGE M., ERROL WILLIAMS, AND DARRYL PETERKIN, Microtubule-associated proteins (MAPs) of dogfish brain and squid optic ganglia, 502
LANGFORD, GEORGE M., see Errol Williams, 505
Lanthanum, 467
Larvae, 124, 168
Larval health of *Hermissenda* in mass culture, 536
Larval
  recruitment, 513
  settlement, 124, 506
LASEK, RAYMOND J., AND SCOTT T. BRADY, Adenlyl imidodiphosphate (AMP-PNP) a non-hydrolyzable analogue of ATP produces a stable intermediate in the motility cycle of fast axonal transport, 503
LASEK, RAYMOND J., see Karl R. Fath, 502; and Robert H. Miller, 503
LASKER, HOWARD R., see William S. Clayton, Jr., 590
LASTA, CARLOS, AND MIGUEL PASCUAL, The effect of different diets on the growth of juvenile striped mullet, *Mugil cephalus*, Linnaeus, 509
Learning, 521
*Lebrunia coralligens*, 601
LEHMAN, H. K., D. A. PRICE, AND M. J. GREENBERG, The FMRFamide-like neuropeptide of *Aplysia* is FMRFamide, 460
LEIBOVITZ, LOUIS, JOHN A. PAIGE, AND JOSEPH BIDWELL, Amoebiasis of larval sea hares (*Aplysia californica*), 537
LEIBOVITZ, LOUIS, see Michael Johnson, 536
Leiobnathidae, 410
*Leishmania* tubulin genes, 537
Lens, ocular, 541
LEONARD, C. S., see R. Llinas, 529; and T. L. McGuinness, 530
LEUM, L., see D. Harn, 536
LEVANDOWSKY, M., T. CHENG, A. KEHR, J. KIM, L. GARDNER, L. SILVERN, L. TSANG, G. LAI, C. CHUNG, AND E. PRAKASH, Chemosensory responses to amino acids and certain amines by the ciliate *Tetrahymena*: a flat capillary assay, 322
LEWENSTEIN, LISA A., AND WILLIAM N. ROSS, Regional properties of calcium entry in a barnacle neuron, 529
LEWIS JOHN B., Photosynthetic production by the coral reef anemone, *Lebrunia coralligens* Wilson, and behavioral correlates of two nutritional strategies, 601
Life history, 516
Light organ symbiosis, 410
Light scattering, 531
*Limulus* blood, 538
*Limulus polyphemus*, 522, 527
Lipids, digestion of, 698
*Littorina littorea*, *Arbacia punctulata*, and *Strongylocentrotus drobachienesis* as grazers on *Codium fragile*, 513
LLINAS, R., M. SUGIMORI, AND C. S. LEONARD, Transmitter release by local increase in $[Ca^{++}]_0$ and by prolonged voltage steps in the squid giant synapse, 529
LLINAS, R., see T. L. McGuinness, 530
Lobster, 94, 339, 506, 510, 525
LOFTON, LISA M., see Philip J. Stephens, 713
LONDON, J. A., D. ZECEVIC, AND L. B. COHEN, Optical recording of neuronal activity of the buccal ganglion of *Navanax* during feeding, 529
Long-term population dynamics, 630
Low pH sodium-free sea water reversibly blocks cleavage in embryos of *Arbacia punctulata*, 516
*Lucina floridana*, 445
Luminescence, 410, 523
LUNECKE, KARIN, AND EDUARDO JARAMILLO, The role of sediments in the distribution of *Uca pugilator* and *Uca pugnax* (Crustacea, Brachyura) in a salt marsh at Woods Hole, Massachusetts, 510
LUTZ, D. A., see R. E. Akins, 501
LYNN, D. G., see S. S. Koide, 519

## M

MACNICHOL, E. F., JR., see B. A. Collins, 437
MACALUSO, M., see R. Vitturi, 658

MACKIE, G. O., P. A. V. ANDERSON, AND C. L. SINGLA, Apparent abscene of gap junctions in two classes of Cnidaria, 120
Malaria, 535
MALAVAL, LUC, see Mari-Luz Hernandez-Nicaise, 210
*Manduca sexta,* 555, 568
MARGULIS, ABIGAIL, Analysis and comparison of stomach contents of the hermit crab, *Pagurus longicarpus* in salt marsh sandy creek bottoms, mud flats, and rocky intertidal zones, 510
Mariculture, 536
Maternal RNA, 521
Mating behavior of *Limulus:* relation to lunar phase, tide height, and sunlight, 527
Mating behavior, 522
Mating behavior, *Carcinonemertes,* 426
MAUGEL, TIMOTHY K., see Charles H. Sullivan, 378
Mauthner cell, 535
Mauthner cells, Muller cells, and the lamprey startle response, 525
MAZZOCCHI, PAUL H., see Sidney K. Pierce, 495
MCCANN-COLLIER, MARJORIE, Microscopic observations of cryptic polar body production and spiralian organization in the egg of *Ilyanassa obsoleta,* 488
MCCUTCHAN, THOMAS F., see Peter H. David, 535
MCFADDEN, CATHERINE, S., see Leo W. Buss, 139
MCGUINNESS, T. L., C. S. LEONARD, M. SUGIMORI, R. LLINAS, AND P. GREENGARD, Possible roles of synapsin I and $Ca^{++}$/calmodulin-dependent protein kinase II in synaptic transmission as studied in the squid giant synapse, 530
MCGURK, JAMES, AND WERNER GRAF, Cerebellar field potentials evoked by optic nerve stimulation in the little skate, *Raja erinacea,* 530
MCLAUGHLIN, JANE, see Peter Gascoyne, 539; and Ronald Pethig, 539
MCMAHON, ANDREW P., see David J. Goldhamer, 518
MCPHIE, DONNA, AND JELLE ATEMA, Chemical communication in lobsters: information currents, 510
Mechanical stimulation, 540
Meiosis, 519
*Melampus,* 515
MENDIS, KAMINI N., see Peter H. David, 535
MERZ, RACHEL ANN, Self-generated *versus* environmentally produced feeding currents: a comparison for the sabellid polychaete, *Eudistylia vancouveri,* 200
Metallothionein, 704
Metamorphosis, 124, 555
Methanogenic bacteria isolated from the purple sand of the Sippewissett Marsh, 509
Methanogens, 509
MICHEL, WILLIAM C., see Richard K. Zimmer-Faust, 339
Microbeam, 501
Microbial mats, 511, 512
Microscopic observations of cryptic polar body production and spiralian organization in the egg of *Ilyanass obsoleta,* 488
Microspectrophotometry, 437
Microtubule assembly and pronuclear movement analyzed by microbeam inactivation of Colcemid, 501
Microtubule-associated proteins (MAPs) of dogfish brain and squid optic ganglia, 502
Mirotubule-associated proteins, 505
Microtubules, in brain, 505
MILLER, ROBERT H., AND RAYMOND J. LASEK, Cross-bridges between axonally transported vesicles and microtubules in cold-blocked squid axoplasm, 503
Modulation of oocyte maturation by membrane components in *Spisula,* 520
Mollusc, 124
Molt synchrony of *Emerita analoga,* 579
Molting, 568
MOORE, JOHN W., see Ralph E. Davis, 525
Morphological and behavioral defenses of trochophore larvae of *Sabellaria cementarium* (Polychaeta) against four planktonic predators, 168
Morphological observations and microspectrophotometric data from photoreceptors in the retina of the sea raven, *Hemitripterus americanus,* 437
Morphology, 437
Morphology and physiology of the giant interneurons of the hermit crab *Pagurus pollicaris,* 533
MORSE, DANIEL E., see Andrea J. Baloun, 124
MOSS, ANTHONY G., AND SIDNEY L. TAMM, Correlates of electrical and mechanical activity during ciliary reversal in the ctenophore *Pleurobrachia pileus,* 504
Mud, 510
Muller cells, 525
MURPHY, GEORGE L., AND BEVERLY K. PIERSON, Photosynthetic activity of microbial mats at Great Sippewissett Marsh, 511
MUSCATINE, L., see R. Grant Steen, 477
Muscle, 94, 713

## N

NADEAU, LLOYD, see Michael J. Good, 535
NAGEL, RONALD L., see Thomas A. Borgese, 538
NAITO, SHIGETAKA, see Daniel L. Alkon, 521
Naloxone, 524
Navanax, 529
NEARY, JOSEPH T., see Daniel L. Alkon, 521
NELSON, LEONARD, see Lucio Cariello, 524
Nemertean
  feeding biology, 426
  mating behavior, 426
Neomycin and other aminoglycoside antibiotics depress a light scattering change associated with secretion from nerve terminals of the mammalian neurohypophysis, 531
Nerve, 713
Nerve gas, 539
Neurobiology, 94
Neuropile, 532
New aspects of the development of the polyclad, *Hoploplana inquilina,* 519
New topoisomerase in *Escherichia coli,* A, 507

NICAISE, GHISLAIN, see Mari-Luz Hernandez-Nicaise, 210
NICHOLSON, JO ANN M., AND BEVERLY K. PIERSON, Spatial relationships in the microbial mat community of Great Sippewissett Marsh using scanning electron microscopy, 511
NICK, JERRY, HILDE NISSEN, KESHAV SINGH, HARLYN O. HALVORSON, AND ALEX KEYNAN, Factors affecting the synthesis and release of polyphosphate in *Pseudomonas vesicularis*, 512
Nicotine, 534
NISSEN, HILDE, see Jerry Nick, 512
Normal and transformed cells, 539
Novel nucleotide from *Spisula* regulating meiotic arrest of oocytes, A, 519
Nudibranch feces, 159
Nudibranchia, 543
Nutrient translocation in the sea star: whole-body and microautoradiography after ingestion of radiolabeled leucine and palmitic acid, 669
Nutritional strategies, 601

## O

OBAID, A. L., see T. D. Parsons, 531
Observations on the long-term population dynamics of the perennial ascidian, *Ascidia mentula* O. F. Müller, on the Swedish west coast, 630
Octocoral, 613
Oculomotor neurons, 527
OESTERLE, ADAIR L., AND BEVERLY K. PIERSON, Pigment analysis of the photosynthetic bacteria of the Sippewissett Marsh microbial mats, 512
Olfactory bulb, 522
Oligotroph, 507
OLIVER, JOHN S., AND RIKK G. KVITEK, Side-scan sonar records and diver observations of the gray whale (*Eschrichtius robustus*) feeding grounds, 264
Oocyte maturation, 518, 519, 520
Ooplasmic segregation, 371
Opisthobranchia, 543
Optic nerve, 530
Optical measurements of activation and inactivation of sodium channels, 528
Optical monitoring system, 529
Optical recording of neuronal activity of the buccal ganglion of *Navanax* during feeding, 529
Osmoregulation, 495
Osphradium, 310
Ova, 271
Oxygen isotopes, 186
Oysters, 251

## P

*Pagurus longicarpus*, 510
PAIGE, JOHN A., see Louis Leibovitz, 537
*Palio*, 543
*Palythoa*, 477
*Panulirus*, 339
PARKER, GISÈLE MULLER, Dispersal of zooxanthellae on coral reefs by predators on cnidarians, 159
PARRINELLO, NICOLO, ELEONORA PATRICOLO, AND CALOGERO CANICATTI, Inflammatory-like reaction in the tunic of *Ciona intestinalis* (Tunicata). I. Encapsulation and tissue injury, 229
PARRINELLO, NICOLO, AND ELEONORA PATRICOLO, Inflammatory-like reaction in the tunic of *Ciona intestinalis* (Tunicata). II. Capsule components, 238
PARSONS, T. D., A. L. OBAID, AND B. M. SALZBERG, Neomycin and other aminoglycoside antibiotics depress a light scattering change associated with secretion from nerve terminals of the mammalian neurohypophysis, 531
PASCUAL, MIGUEL, see Carlos Lasta, 509
Pathology, 536
PATRICOLO, ELEONORA, see Nicolo Parrinello, 229, 238
Patterns of whole colony prey capture in the octocoral, *Alcyonium siderium*, 613
PATTERSON, MARK R., Patterns of whole colony prey capture in the octocoral, *Alcyonium siderium*, 613
PATZKOWSKY, MARK E., The effect of colony density on larval recruitment in two species of *Bugula* (Ectoprocta) in Eel Pond, Woods Hole, Massachusetts, 513
PAXHIA, TERESA, see Seymour Zigman, 541
PAYNE, RICHARD, ALAN FEIN, AND D. WESLEY CORSON, A rise in intracellular calcium is necessary and perhaps sufficient for photoreceptor excitation and adaptation by inositol 1,4,5-trisphosphate, 531
PAYNE, RICHARD, see Alan Fein, 526; and D. Wesley Corson, 522
PENNINGTON, J. TIMOTHY, AND FU-SHIANG CHIA, Morphological and behavioral defenses of trochophore larvae of *Sabellaria cementarium* (Polychaeta) against four planktonic predators, 168
PETERKIN, DARRYL, see Errol Williams, 505; and George M. Langford, 502
PETERSEN, MARY E., *Chaetopterus variopedatus* (Renier) (Annelida: Polychaeta: Chaetopteridae): a species complex. What species are being used at MBL? 513
PETHIG, RONALD, PETER GASCOYNE, JANE MCLAUGHLIN, AND ALBERT SZENT-GYÖRGYI, Studies of the scavenging of anionic free radicals by Ehrlich ascites cells, 539
PETHIG, RONALD, see Peter Gascoyne, 539
PEZZANO, MARK, *Littorina littorea*, *Arbacia punctulata*, and *Strongylocentrotus drobachiensis* as grazers on *Codium fragile*, 513
Phospholipase-C, 526
Phospholipids, 520
Phosphorylation, 521
*Photobacterium leibbnathi*, 410
Photobiology of the symbiotic sea anemone, *Anthopleura elegantissima:* defenses against photo-

dynamic effects, and seasonal photoacclimatization, 683
Photodynamic action, enzymic defenses, 683
Photoreception, 531
Photoreceptor, 437, 524
responses, 532
terminals, 525
Photosynthesis, 590
Photosynthetic activity of microbial mats at Great Sippewissett Marsh, 511
Photosynthetic pigments, 512
Photosynthetic production by the coral reef anemone, *Lebrunia coralligens* Wilson, and behavioral correlates of two nutritional strategies, 601
Phototransduction, 526
Physiological and morphological state of the symbiotic bacteria from light organs of ponyfish, 410
PIERCE, SIDNEY K., SAMUEL C. EDWARDS, PAUL H. MAZZOCCHI, LORI J. KLINGLER, AND MARY K. WARREN, Proline betaine: a unique osmolyte in an extremely euryhaline osmoconformer, 495
PIERSON, BEVERLY K., see Adair L. Oesterle, 512; George L. Murphy, 511; and Jo Ann M. Nicholson, 511
Pigment analysis of the photosynthetic bacteria of the Sippewissett Marsh microbial mats, 512
Plankton, 168
POINDEXTER, JEANNE S., see Geoffrey C. Compeau, 507; Karen L. Anderson, 506; and Nancy J. Schenck, 514
Polar body production in the *Ilyanassa* egg, 488
POLLERO, RICARDO J., see Graciela A. Huca, 698
*Polycera*, 543
Polychaete feeding, 200
Polyclad, 517, 519
Polymorphism, chromosome, 658
Polyphosphate storage, 512
Polyspermy, 271
Ponyfish light organ symbiosis, 410
Population dynamics of *Ascidia*, 630
Possible roles of synapsin I and $Ca^{++}$/calmodulin-dependent protein kinase II in synaptic transmission as studied in the squid giant synapse, 530
Potassium channel, 533
POWERS, MAUREEN K., see Heidi A. Howard, 527, and Robert B. Barlow, Jr., 522
PRAKASH, E., see M. Levandowsky, 322
Predation, 168
Predation resistance, 390
PREGNALL, A. MARSHALL, see Robert D. Smith, 514
Preliminary studies of bioenergetic partitioning in specimens of the salt-marsh pulmonate, *Melampus bidentatus*, 515
Preliminary study of the effect of mechanical disturbance on marine sediments, 505
Prevention of polyspermic fertilization in sea urchins, The, 271
Prey capture in a soft coral, 613
PRICE, D. A., see H. K. Lehman, 460
Primary afferents and efferents, 522
Production by a coral reef anemone, 601
Proline betaine: a unique osmolyte in an extremely euryhaline osmoconformer, 495
Prosobranchia, 310
Protease plasma, 520
Protective monoclonal antibody to *S. mansoni* induces both anti-idiotypic and idiotypic monoclonal antibodies as well as anti-idiotypic T cells, 536
Protein phosphorylation, 530
Protein synthesis in normal and lobeless gastrulae of *Ilyanassa obsoleta*, 371
Proteinase inhibitors, 538, 540
Proteins, microtubule-associated, 502, 505
*Pseudomonas vesicularis*, 512
Psoralen, 521
Puncture strength, 390
Purple sulfur bacteria, 508

## Q

QUIGLEY, JAMES P., see Michael T. Rossner, 540; and Peter B. Armstrong, 538

## R

Regional properties of calcium entry in a barnacle neuron, 529
Relationships between free cupric ion concentrations in sea water and copper metabolism and growth in crab larvae, 704
Relative amounts of the major microtubule-associated proteins (MAPs) in different areas of dogfish central nervous system, 505
RENNINGER, GEORGE H., EHUD KAPLAN, AND ROBERT B. BARLOW, JR., A circadian clock increases the gain of photoreceptor cells of the *Limulus* lateral eye, 532
Reproduction, 543
Reproduction, embryonic energetics, and the maternal-fetal relationship in the viviparous genus *Sebastes* (Pisces: Scorpaenidae), 354
Reproductive patterns, 630
Reproductive strategy, 354, 516
Respiration, 515
REYNOLDS, GEO. T., ALAN J. WALTON, AND DONALD M. ANDERSON, Stimulation of bioluminescence in fluid flow, 540
Rise in intracellular calcium is necessary and perhaps sufficient for photoreceptor excitation and adaptation by inositol 1,4,5-trisphosphate, 531
RIVEST, BRIAN R., Copulation by hypodermic injection in the nudibranchs *Palio zosterae* and *P. dubia* (Gastropoda, Opisthobranchia), 543
Rocky intertidal, 176
Rocky-bottom monitoring, 630
ROE, PAMELA, Laboratory studies of feeding and mating in species of *Carcinonemertes* (Nemertea: Hoplonemertea), 426
ROE, PAMELA, see Daniel E. Wickham, 331

Role of sediments in the distribution of *Uca pugilator* and *Uca pugnax* (Crustacea, Brachyura) in a salt marsh at Woods Hole, Massachusetts, 510
Role of zooxanthellae in zoanthids, 477
ROLLER, RICHARD A., see David W. Garton, 310
ROONEY, LOUISA M., AND BARBARA C. BOYER, New aspects of the development of the polyclad, Hoploplana *inquilina*, 519
ROSS, WILLIAM N., AND KATHERINE GRAUBARD, Calcium oscillations in the neuropile of crab stomatogastric neurons detected with Arsenazo III, 532
ROSS, WILLIAM N., see Lisa A. Lewenstein, 529
ROSSNER, MICHAEL T., PETER B. ARMSTRONG, AND JAMES P. QUIGLEY, An alpha-2-macroglobulin-like proteinase-binding activity in the blood of crustaceans, 540

## S

SAFRANEK, LOUIS, AND CARROLL M. WILLIAMS, Critical weights for metamorphosis in the tobacco hornworm, *Manduca sexta*, 555
SAFRANEK, LOUIS, AND CARROLL M. WILLIAMS, Determinants of larval molt initiation in the tobacco hornworm, *Manduca* sexta, 568
SAHNI, M. K., see S. S. Koide, 519
SAKAKIBARA, MANABU, see Daniel L. Alkon, 521
Salt tolerance of germination of *Bacillus* spores from terrestrial and marine marsh origins, 515
SALZBERG, B. M., see T. D. Parsons, 531
Sand, 510
Sand crab, see *Emerita analoga*
SANDERS, BRENDA M., AND KENNETH D. JENKINS, Relationships between free cupric ion concentrations in sea water and copper metabolism and growth in crab larvae, 704
SATO, E., S. J. SEGAL, AND S. S. KOIDE, Modulation of oocyte maturation by membrane components in *Spisula*, 520
SATO, E., see S. S. Koide, 519
Scanning electron microscopy, 511
Scavenging of ascorbic acid and semiquinone free radicals by normal and transformed cells, The, 539
SCHEFFEY, CARL, see Uri Katz, 528
SCHENCK, NANCY J., AND JEANNE S. POINDEXTER, Interference of group-dependent motility with detection of chemotaxis in cytophagas, 514
*Schistosomiasis mansoni*, 536
SCHROER, TRINA A., AND SCOTT T. BRADY, Fast axonal transport (FAT) of fluorescently labelled elasmobranch synaptic vesicles in isolated axoplasm from squid giant axon, 504
SCHUEL, HERBERT, The prevention of polyspermic fertilization in sea urchins, 271
*Scoloplos fragilis*, 508
Sea anemones, behavior, photobiology, enzyme activity, 683
Sea raven, 437
Sea robin, 535
Sea scallop growth rates, 186
Sea star, 669
Sea urchin, 271
Secretion, 531
Sediment stability, 507
Sediments, 505
SEGAL, S. J., see E. Sato, 520; and Hiroshi Ueno, 520
Self-generated *versus* environmentally produced feeding currents: a comparison for the sabellid polychaete, *Eudistylia vancouveri*, 200
*Semibalanus*, 176
Serotonin induction of spawning and oocyte maturation in *Spisula*, 518
Sex discrimination in lobsters: urine cues, 525
Sexual transmission of *Carcinonemertes*, 331
Shade and competition in barnacles, 176
SHICK, J. MALCOLM, see James A. Dykens, 683
Side-scan sonar records and diver observations of the gray whale (*Eschrichtius robustus*) feeding grounds, 264
SIEGEL, PAUL R., Food-induced size-specific molt synchrony of the sand crab, *Emerita analoga* (Stimpson), 579
SILVERN, L., see M. Levandowsky, 322
SIM, KIM LEE, SCOTT LANDFEAR, AND DYANN WIRTH, Digestion of tubulin genes from *Leishmania enriettii* with mung bean nuclease, 537
SINGH, KESHAV K., WALTER S. VINCENT, AND CHRISTOPHER J. GRIFFITH, Clumping behavior of bacteria isolated from waste water treatment sludge, 514
SINGH, KESHAV, see Jerry Nick, 512
SINGLA, C. L., see G. O. Mackie, 120
Skate, 530
Skeletal mechanics, 390
Skeletal strength of encrusting cheilostome bryozoans, 390
SMITH, ROBERT D., A. MARSHALL PREGNALL, AND RANDALL S. ALBERTE, Diurnal changes in free amino acid patterns of *Zostera marina* L. roots, 514
Smooth muscle, 210
Sodium channels, 528
Sodium current, 528
Sodium ions, transport, 524
Soft-bottoms, 264
Sonar, 264
Spatial relationships in the microbial mat community of Great Sippewissett Marsh using scanning electron microscopy, 511
Spawning, 518
Species complex, 513
Spectrin, 502
Sperm, 271
Sperm motility, 520, 524
Spiral cleavage, 488
*Spisula* membrane, 520
Sponge cells, 540
Spore germination, 515
Squid, 529, 539, 541
Squid giant axon, 502, 503, 524, 528
Squid giant synapse, 467, 532

Squid, *in vitro* fertilization, 518
STANLEY, E. F., Decline in calcium cooperativity as a mechanism of facilitation at the squid giant synapse, 532
STANLEY, E. F., AND W. J. ADELMAN, JR., Direct access of ions to the squid stellate ganglion giant synapse by aortic perfusion: effects of calcium-free medium, lanthanum, and cadmium, 467
Starfish development, 518
Startle, 525
Steady currents go through *Acetabularia crenulata:* a vibrating probe analysis, 501
STEEN, R. GRANT, AND L. MUSCATINE, Daily budgets of photosynthetically fixed corbon in symbiotic zoanthids, 477
STEINACKER, A., Acetylcholine modulated potassium channels in the vestibular hair cell of the toadfish, *Opsanustau,* 533
STEPHENS, PHILIP J., LISA M. LOFTON, AND PETER KLAINER, The dimorphic claws of the hermit crab, *Pagurus pollicaris:* properties of the closer muscle, 713
STEPHENS, PHILIP J., Morphology and physiology of the giant interneurons of the hermit crab *Pagurus pollicaris,* 533
Stimulation of bioluminescence in fluid flow, 540
Stimulus-response coupling in marine sponge cells: studies employing fluorescent dyes to monitor effects of calcium pulses, 540
Stomach contents, 510
Stomatogastric ganglion, 532
Stretch receptor, 534
*Strongylocentrotus drobachiensis,* 513
STUART, ANN E., see Ralph E. Davis, 525
Studies of the scavenging of anionic free radicals by Ehrlich ascites cells, 539
Study of spore forming bacteria isolated from the deep sea, A, 516
Substrate hydrophobicity, 506
Substratum hydrophobicity and larval settlement in *Janua (Dexiospira) brasiliensis* Grube (Polychaeta: Spirorbidae), 506
SUGIMORI, M., see R. Ilinas, 529; and T. L. McGuinness, 530
SULLIVAN, CHARLES H., AND TIMOTHY K. MAUGEL, Formation, organization, and composition of the egg capsule of the marine gastropod, *Ilyanassa obsoleta,* 378
Sun and shade mediate competition in the barnacles *Chthamalus* and *Semibalanus:* a field experiment, 176
Superoxide dismutase, 683
Suppressant, 339
Suspension feeding, 200
Suspension feeding, passive, 613
SVANE, IB, Observations on the long-term population dynamics of the perennial ascidian, *Ascidia mentula* O. F. Müller, on the Swedish west coast, 630
Symbiosis, 445
Synapsin I, 530
Synaptic potentials in antidromically identified oculomotoneurons in the winter flounder, *Pseudopleuronectes americanus,* 527
Synaptic transmission, 529, 530
Synaptic vesicles, 504
Synthesis of heat shock proteins during development of the starfish, *Asterias forbesi,* 518
SZENT-GYÖRGYI, ALBERT, see Peter Gascoyne, 539; and Ronald Pethig, 539

## T

TAMM, SIDNEY L., see Anthony G. Moss, 504
TASHIRO, JAY SHIRO, CHRIS FLEMMING, AND DAN DESSNER, Preliminary studies of bioenergetic partitioning in specimens of the salt-marsh pulmonate, *Melampus bidentatus,* 515
TAYLOR, ROBERT F., Chemosensitivity to nicotine in the crayfish slowly adapting stretch receptor, 534
Temporal covariation in recruitment and mortality, 630
*Tetrahymena,* 322
Tetrameric and dimeric hemoglobins, 538
Tetrodotoxin, 528
*Thais haemastoma,* 310
TIERNAN, THERESA A., ALEX KEYNAN, AND HARLYN O. HALVORSON, Salt tolerance of germination of *Bacillus* spores from terrestrial and marine marsh origins, 515
TIERNAN, THERESA A., see Peter B. Vander Horn, 516
Toad, 528
Toadfish, 522
Tobacco hornworm, see *Manduca sexta*
Topoisomerases, 507
Transfer of nemertean egg predators during host molting and copulation, 331
Transmitter release by local increase in $[Ca^{++}]_0$ and by prolonged presynaptic voltage steps in the squid giant synapse, 529
Transport of $Na^+$ inside the giant axon of squid, 524
Transport, 507
Tripalmitoylglycerol, 698
Triple cones, 437
Trochophores, 168
TROLL, WALTER, see Frederic Blum, 517
TSANG, L., see M. Levandowsky, 322
Tunic cells of *Ciona intestinalis,* 229, 238
Tunic reaction of *Ciona intestinalis,* 229, 238
*Turbellaria,* 517, 519
TWAROG, JOSEPH W., JR., see Gary H. Wikfors, 251
TYRE, JEFFREY E., see Richard K. Zimmer-Faust, 339

## U

UENO, HIROSHI, SHELDON J. SEGAL, AND SAMUEL S. KOIDE, Isolation and characterization of *Spisula* sperm components modified by $^{14}C$-gossypol, 520
UKELES, RAVENNA, see Gary H. Wikfors, 251

Ultrastructure, 210
URQUHART, HEATHER, see Michael Johnson, 536

## V

VANDER HORN, PETER B., THERESA A. TIERNAN, ALEX KEYNAN, HOLGER JANNASCH, AND HARLYN O. HALVORSON, A study of spore forming bacteria isolated from the deep sea, 516
Variation in growth of post-metamorphic *Aplysia californica,* 535
Vertical distribution, 512
Vestibular, 523
Vestibular hair cell, 533
Vestibulo-ocular reflex, 527
Vibrating probe, 501, 528
Video-microscopy, 503
VINCENT, WALTER S., see Keshav K. Singh, 514
Vision, 522
Vision in *Limulus* mating behavior during the day and at night, 522
Visual system, 541
Vital staining, 310
VITTURI, R., P. CARBONE, E. CATALANO, AND M. MACALUSO, Chromosome polymorphism in *Gobius paganellus,* Linneo 1758 (Pisces, Gobiidae), 658
Viviparity in the genus *Sebastes,* 354
VOIGT, RAINER, AND JELLE ATEMA, Chemoreceptor adaptation: responses of glutamate cells to repeated stimulation, 534
Voltage clamp, 528
Voltage clamp studies of the terminal region of barnacle photoreceptors, 525
Voltage-dependent chloride conductance of toad skin: localization by vibrating probe, 528
VOOGT, P. A., see F. B. Beijnink, 669
VOSSHALL, LESLIE B., PHILIP DUNHAM, CYNTHIA BAYER, AND GERALD WEISSMANN, Stimulus-response coupling in marine sponge cells: studies employing fluorescent dyes to monitor effects of calcium pulses, 540

## W

WALDRON, WILLIAM, see Seymour Zigman, 541
WALTON, ALAN J., see Geo. T. Reynolds, 540
WARREN, MARY K., see Sidney K. Pierce, 495
Waste water sludge, 514
WEINER, ANDREW, see Daniel L. Alkon, 521
WEISER, M., see H. Baker, 522
WEISSMANN, GERALD, see Leslie B. Vosshall, 540
WETHEY, DAVID S., Sun and shade mediate competition in the barnacles *Chthamalus* and *Semibalanus:* a field experiment, 176
Whole animal preparation, 529
Whole-body autoradiography, 669
WICKHAM, DANIEL E., PAMELA ROE, AND ARMAND M. KURIS, Transfer of nemertean egg predators during host molting and copulation, 331
WIKFORS, GARY H., JOSEPH W. TWAROG, JR., AND RAVENNA UKELES, Influence of chemical composition of algal food sources on growth of juvenile oysters, *Crassostrea virginica,* 251
WILLIAMS, CARROLL M., see Louis Safranek, 555, 568
WILLIAMS, DOUGLAS F., see David E. Krantz, 186
WILLIAMS, ERROL, GEORGE M. LANGFORD, AND DARRYL PETERKIN, Relative amounts of the major microtubule-associated proteins (MAPs) in different areas of dogfish central nervous system, 505
WILLIAMS, ERROL, see George M. Langford, 502
WINSTON, JUDITH E., see Barbara A. Best, 390
WIRTH, DYANN F., see Kim Lee Sim, 537; and Peter H. David, 535
WOOD, H. N., see S. S. Koide, 519

## Y

YAN, HONG-YOUNG, Comparative reproductive adaptations of grass shrimps, *Palaemonetes vulgaris* and *P. pugio* in Great Sippewissett Salt Marsh, 516
YOKLAVICH, MARY M., see George W. Boehlert, 354

## Z

ZACKSON, SAUL L., Does maternal RNA have morphogenetic determinant activity in ascidian embryos? 521
ZECEVIC, D., see J. A. London, 529
ZIGMAN, SEYMOUR, TERESA PAXHIA, AND WILLIAM WALDRON, The exquisite squid lens: an alternative system of transparency and accommodation, 541
ZIMMER-FAUST, RICHARD K., JEFFREY E. TYRE, WILLIAM C. MICHEL, AND JAMES F. CASE, Chemical mediation of appetitive feeding in a marine decapod crustacean: the importance of suppression and synergism, 339
Zoanthids, 477
Zoanthus, 477
Zooxanthellae, 477, 590
Zooxanthellae in predator feces, 159
Zooxanthellae, seasonal photoadaptation, 683
*Zostera marina* (L.), 508, 514
ZOTTOLI, STEVEN J., AND MARK A. AGOSTINI, Characterization of the sea robin Mauthner cell, 535